United States Department of Agriculture

Apishapa Watershed

Hydrologic Unit Code 11020007

Natural Resources Conservation Service

Lakewood, Colorado

Rapid Assessment

RWA 11020007

January 2008

Satellite Imagery: ArcIMS Server - Geographic Network Services hosted by ESRI

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Introduction

Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

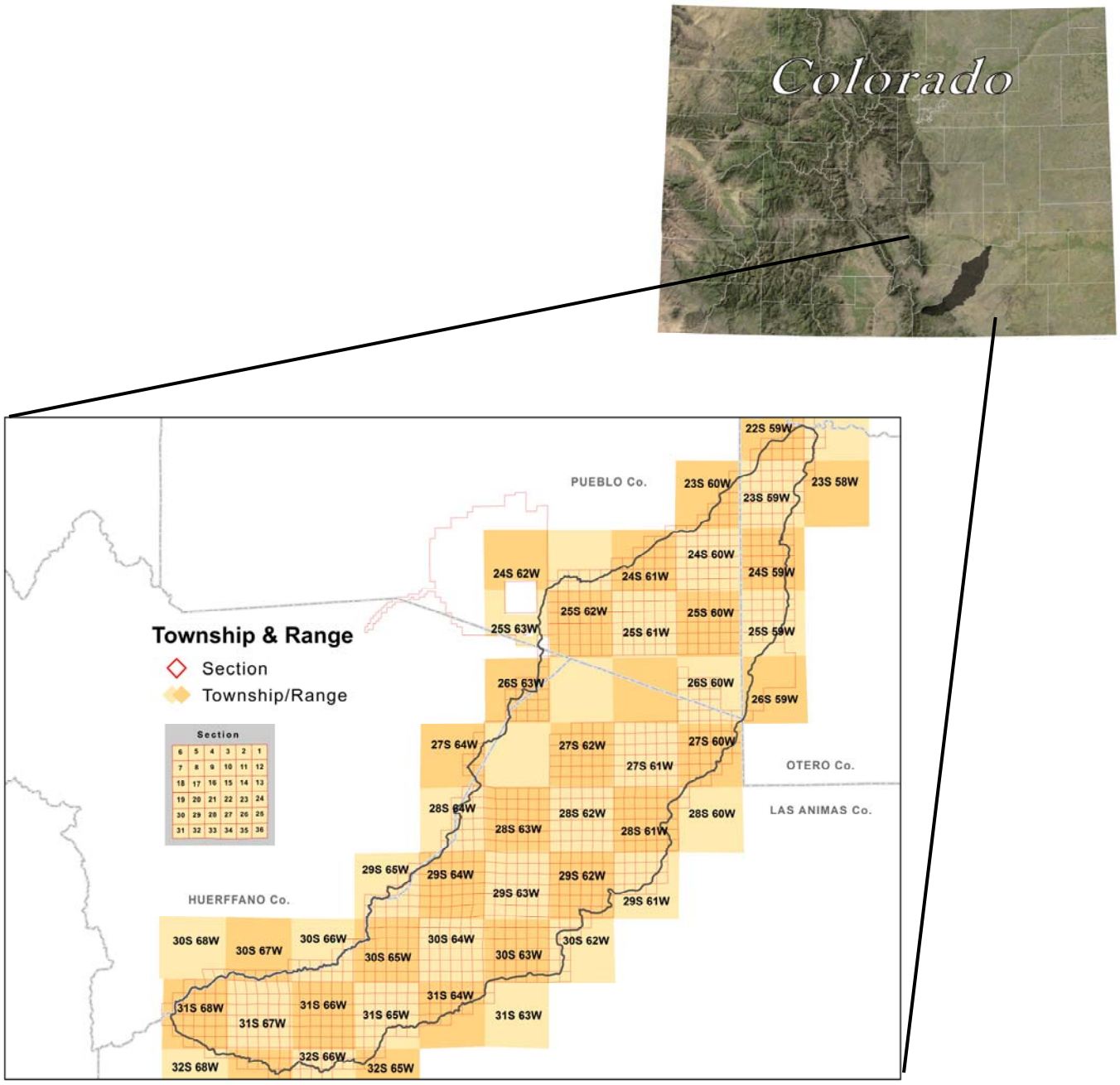
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

Benefits of these Activities

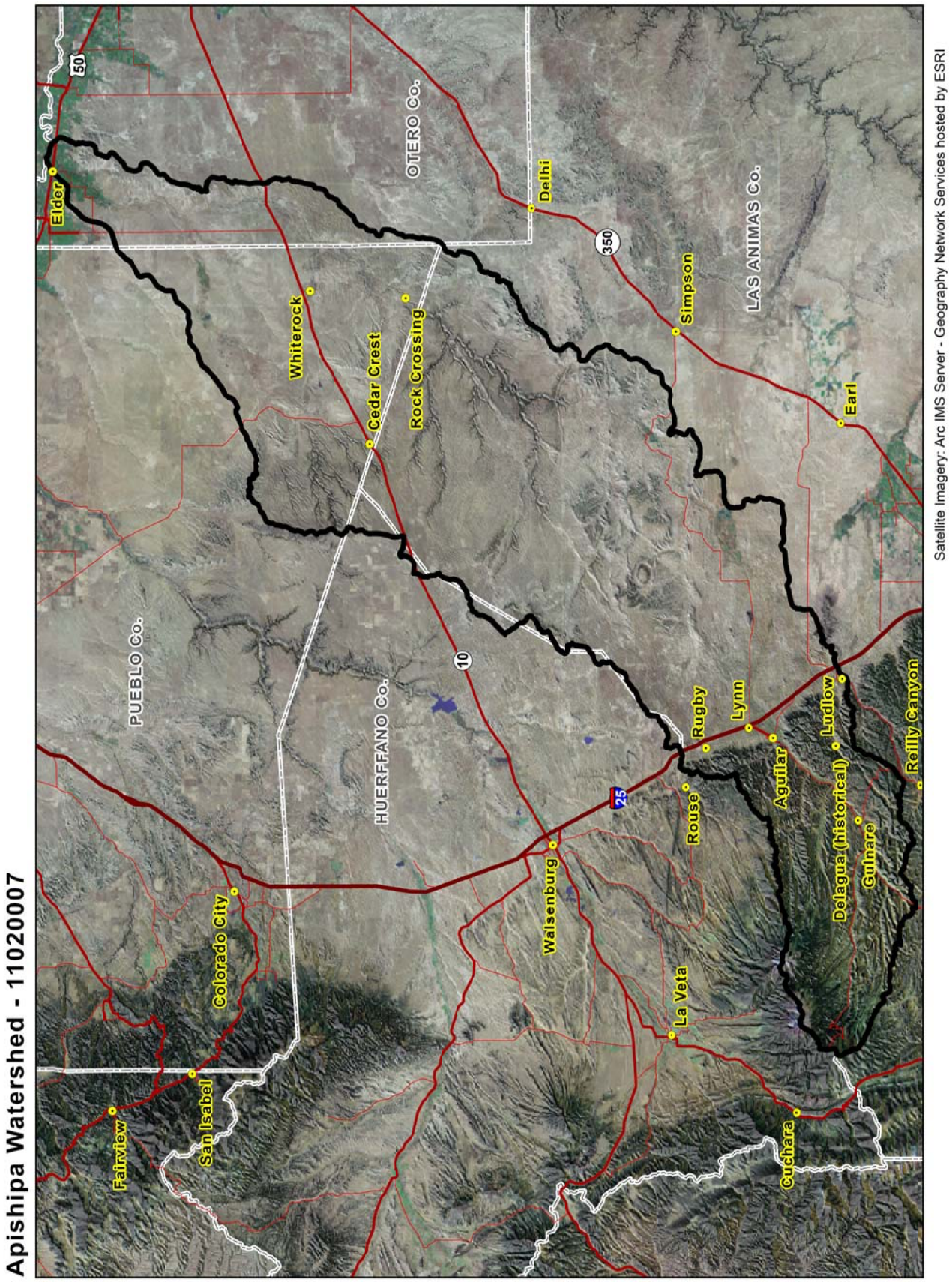
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

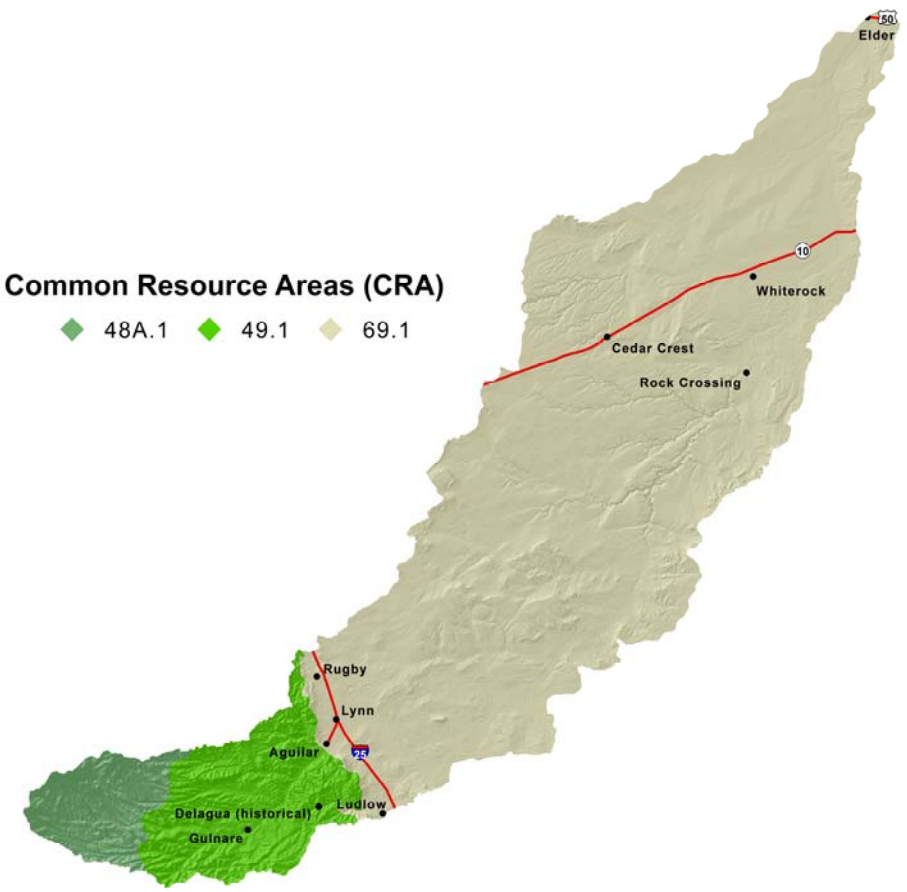
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.



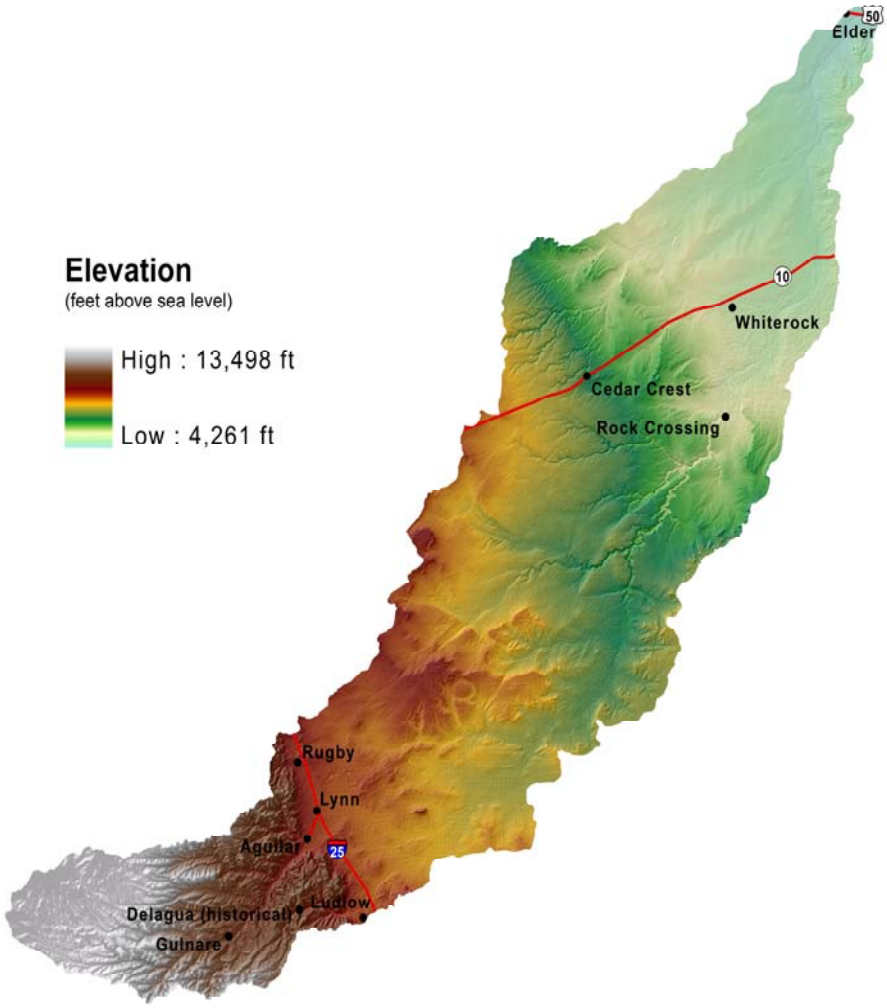
County	County Acres	County Acres in Watershed	% of County in the Watershed	% of Watershed in the County
Huerfano	1,018,970	8,029	0.8%	1.1%
Las Animas	3,054,953	473,349	15.5%	68.6%
Otero	811,808	59,617	7.3%	8.6%
Pueblo	1,533,605	149,081	9.7%	21.6%

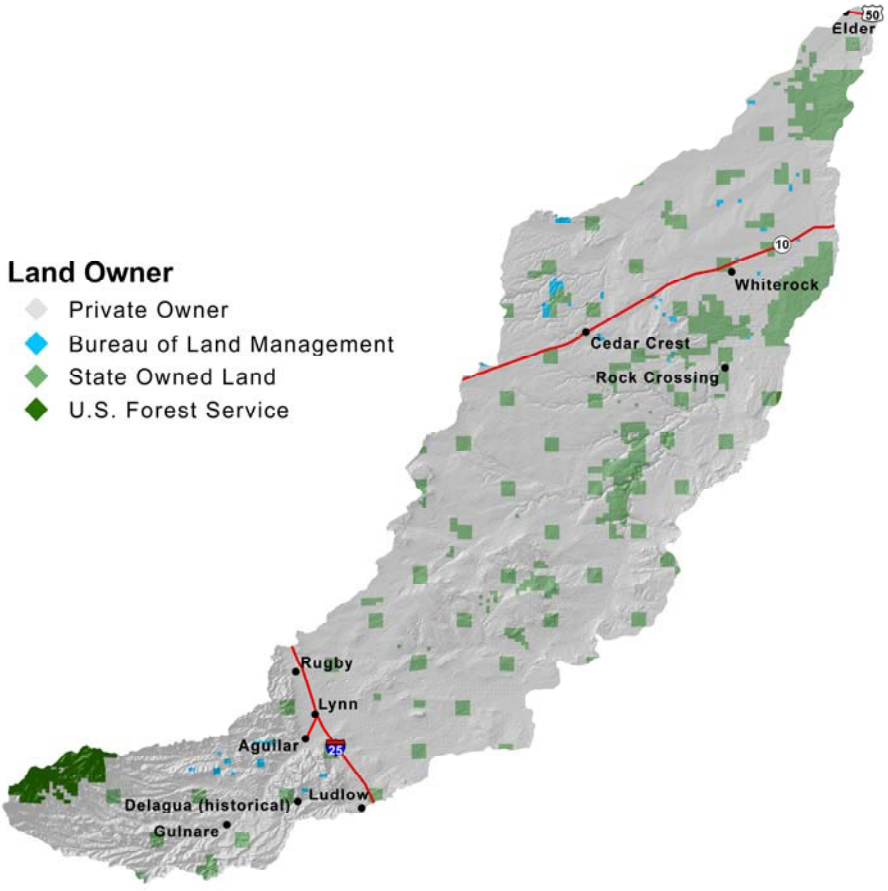

Apishipa Watershed - 11020007
Elder
Whiterock
Cedar Crest
Rock Crossing
Delhi
Simpson
Earl
Rugby
Lynn
Ludlow
Aguilar
Rouse
Reilly Canyon
Delagua (historical)
Gulnare
Walsenburg
La Veta
Colorado City
San Isabel
Fairview
Cuchara
OTERO Co.
LAS ANIMAS Co.
PUEBLO Co.
HUERFFANO Co.
50
350
10
25
Satellite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI



Common Resource Areas (CRA): Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

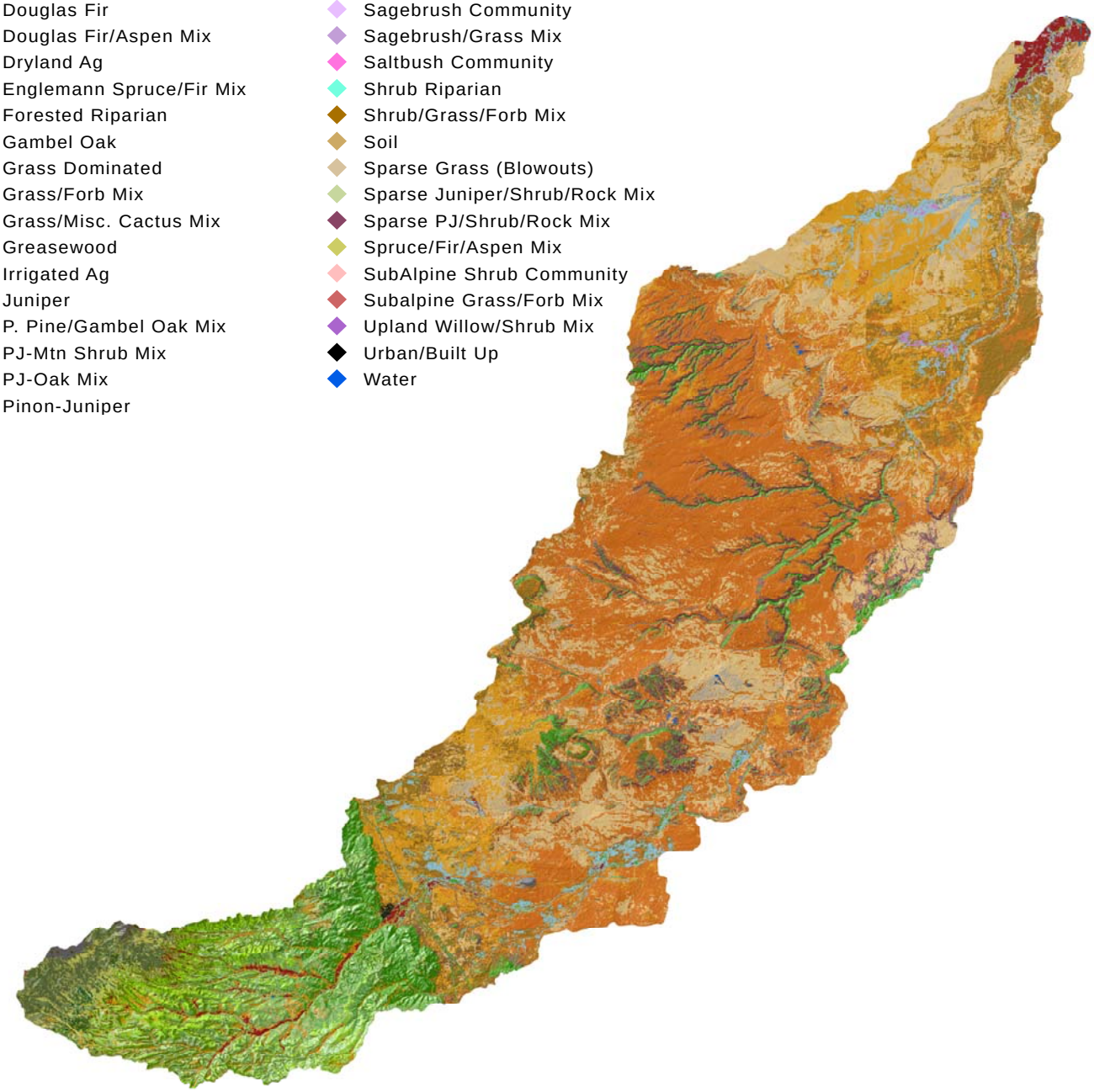
MLRA	CRA	CRA NAME	CRA DESCRIPTION
48A	**48A.1**	Southern Rocky Mountains - High Mountains and Valleys	This area is best characterized by steep, high mountain ranges and associated mountain valleys. The temperature regimes are mostly frigid and cryic; moisture regimes are mainly ustic and udic. Vegetation is sagebrush-grass at low elevations, and with increasing elevation ranges from coniferous forest to alpine tundra. Elevations range from 6,500 to 14,400 feet.
49	**49.1**	Southern Rocky Mountain Foothills	This area is generally a transition between the Great Plains and the Southern Rocky Mountains. The temperature regime is mesic or frigid, and moisture regime is ustic. Characteristic native vegetation ranges from grasslands and shrubs to ponderosa pine and Rocky Mountain Douglas fir forest.
69	**69.1**	Upper Arkansas Valley Rolling Plains	The Upper Arkansas Valley Rolling Plains CRA is broad, undulating to rolling shale plains occurring along the upper tributaries of the Arkansas River. Local relief reaches 200 feet. Soils are shallow to deep and formed in loess, aeolian, alluvial and outwash materials. Pre-settlement vegetation was short grass prairies and pinyon and juniper stands on the stony and rocky soils. Nearly all of this area is in rangeland. Small areas of irrigated cropland occur along the floodplains and terraces.


Elevation
(feet above sea level)
High : 13,498 ft
Low : 4,261 ft
Elder
Whiterock
Cedar Crest
Rock Crossing
Rugby
Lynn
Aguilar
Ludlow
Delagua (historical)
Gulnare
50
10
25


Land Owner
Private Owner
Bureau of Land Management
State Owned Land
U.S. Forest Service
Elder
Whiterock
Cedar Crest
Rock Crossing
Rugby
Lynn
Aguilar
Ludlow
Delagua (historical)
Gulnare
50
10
25

Vegetation

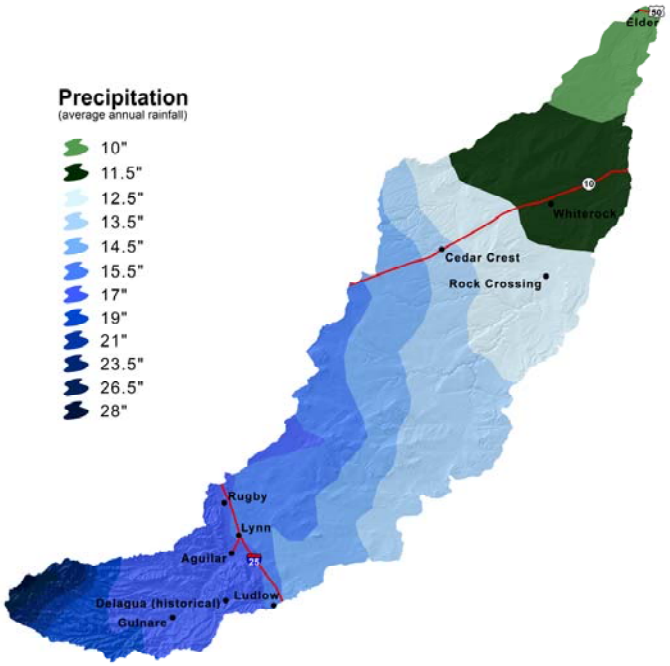
- No Data
- Alpine Grass Dominated
- Alpine Grass/Forb Mix
- Aspen
- Aspen/Mesic Mountain Shrub Mix
- Cottonwood
- Douglas Fir
- Douglas Fir/Aspen Mix
- Dryland Ag
- Englemann Spruce/Fir Mix
- Forested Riparian
- Gambel Oak
- Grass Dominated
- Grass/Forb Mix
- Grass/Misc. Cactus Mix
- Greasewood
- Irrigated Ag
- Juniper
- P. Pine/Gambel Oak Mix
- PJ-Mtn Shrub Mix
- PJ-Oak Mix
- Pinon-Juniper
- Ponderosa Pine
- Ponderosa Pine/Aspen Mix
- Ponderosa Pine/Douglas Fir Mix
- Rabbitbrush/Grass Mix
- Riparian
- Rock
- Sagebrush Community
- Sagebrush/Grass Mix
- Saltbush Community
- Shrub Riparian
- Shrub/Grass/Forb Mix
- Soil
- Sparse Grass (Blowouts)
- Sparse Juniper/Shrub/Rock Mix
- Sparse PJ/Shrub/Rock Mix
- Spruce/Fir/Aspen Mix
- SubAlpine Shrub Community
- Subalpine Grass/Forb Mix
- Upland Willow/Shrub Mix
- Urban/Built Up
- Water



Land Use	Total Acreage	Vegetation	Acreage
Cropland	7,261	Dryland Ag	92
		Irrigated Ag	7,169
Rangeland/Grassland	603,614	Alpine Grass Dominated	58
		Alpine Grass/Forb Mix	152
		Gambel Oak	10,046
		Grass Dominated	122,576
		Grass/Forb Mix	90,916
		Grass/Misc. Cactus Mix	202,842
		Greasewood	21,742
		Juniper	209
		PJ/Mtn Shrub Mix	19
		Pinon Juniper	37,713
		Sagebrush Community	10
		Sagebrush/Grass Mix	31
		Saltbrush Community	1,254
		Shrub/Grass/Forb Mix	62,302
		Sparse Grass (Blowouts)	17,467
		Sparse Juniper/Shrub/Rock Mix	181
		Sparse PJ/Shrub/Rock Mix	36,040
		Subalpine Grass/Forb Mix	52
Forest	76,855	Aspen	2,861
		Aspen/Mesic Mountain Shrub Mix	117
		Cottonwood	1,947
		Douglas Fir	3,986
		Douglas Fir/Aspen Mix	56
		Englemann Spruce/Fir Mix	8,994
		Pinon Pine/Gambel Oak Mix	14,687
		PJ/Oak Mix	23,774
		Ponderosa Pine	9,985
		Ponderosa Pine/Aspen Mix	609
		Ponderosa Pine/Douglas Fir Mix	5,764
		Spruce/Fir/Aspen Mix	4,075
Riparian	145	Forested Riparian	121
		Riparian	4
		Shrub Riparian	20
Water	564	Water	564
Other	1,638	Rock	1,415
		Urban/Built Up	204
		No Data	19
Total Watershed Acres			690,077

Precipitation

Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records have found evidence of even more severe droughts, some lasting many years. Rainfall occurs as frontal storms in the spring and early summer and high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn. Precipitation in winter is snow. The average annual temperature is from 45 to 55 degrees F. The frost free period averages 162 days but ranges from 133 to 191 days.



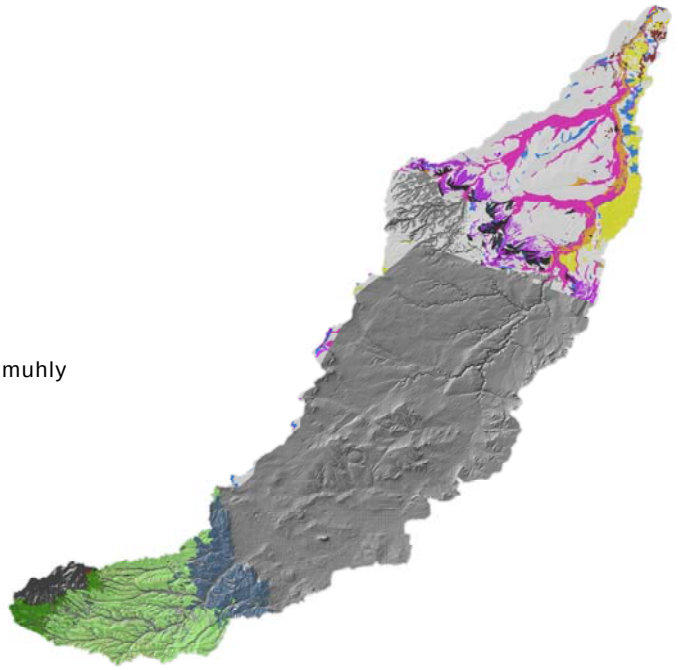
Ecological Sites

The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available online at http://www.nrcs.usda.gov/technical/efotg/.

Soil: Ecological Site Names

- No Data
- Alkaline Plains
- Douglas fir
- Douglas fir/white fir
- Engelmann's spruce-Subalpine fir
- Gravel Breaks
- Limestone Breaks
- Loamy
- Pinyon/juniper
- Rocky Mountain Douglas fir/ponderosa pine/mountain muhly
- Rocky Mountain Douglas fir/white fir
- Saline Overflow
- Salt Flat
- Salt Meadow
- Sands
- Sandstone Breaks
- Sandy Bottomland
- Shaly Plains
- ponderosa pine/mountain muhly



Farmland Classification

- Not prime farmland
- Farmland of statewide importance
- Prime farmland if irrigated
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Class 1 - soils have few limitations that restrict their use.

Class 2 - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

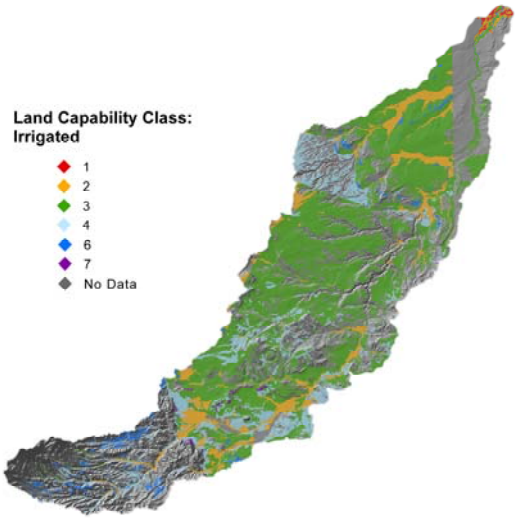
Class 4 - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

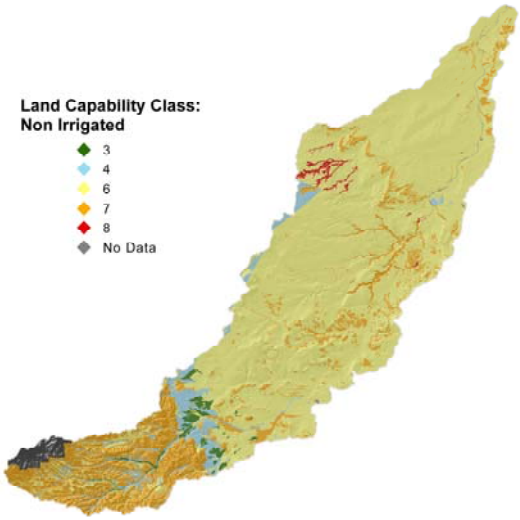
Class 5 - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

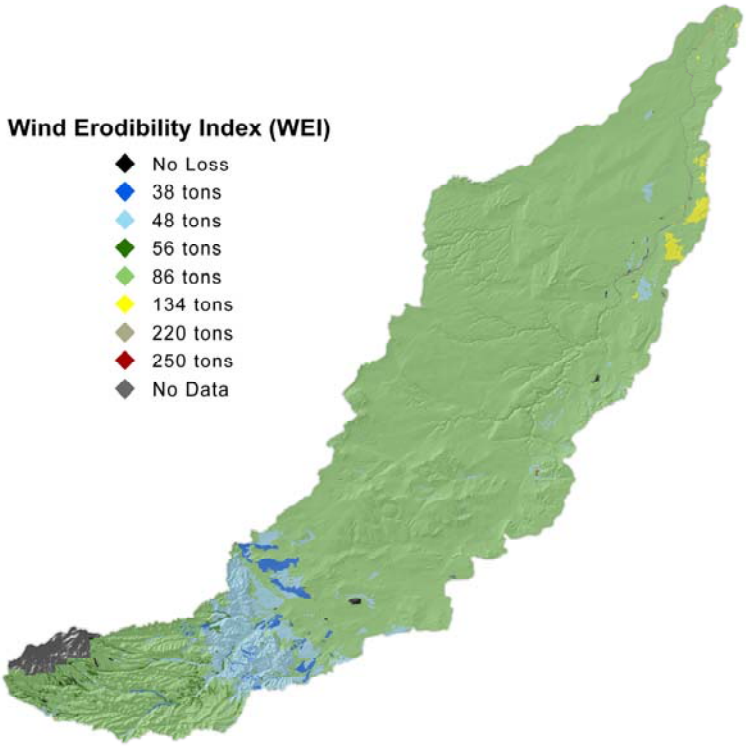
Class 6 - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.







The Wind Erodibility Index (WEI), is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

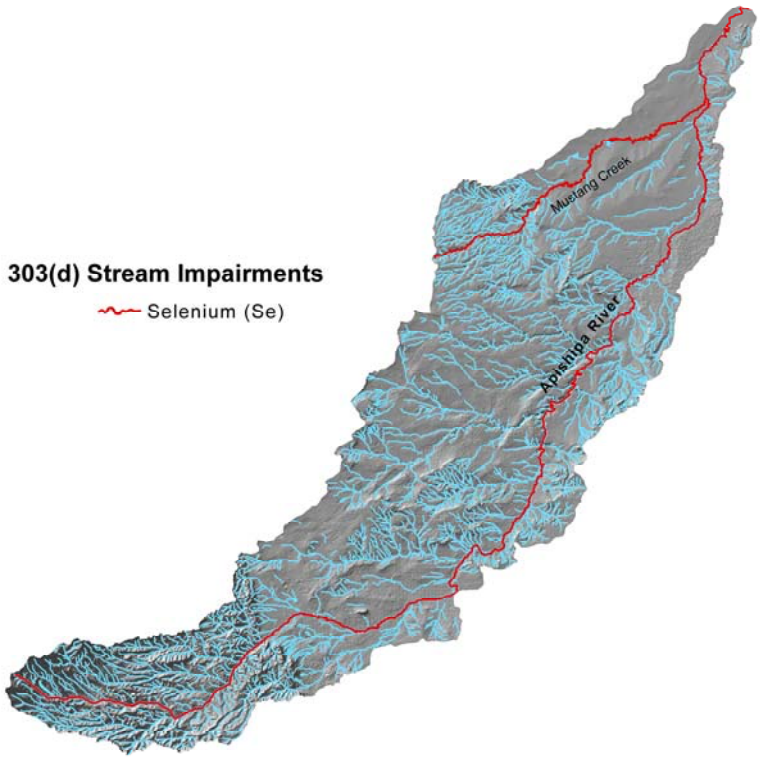
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

Streams Listed as Impaired

Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs comprising of quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.

Impairment Definition

Selenium: A naturally occurring metal in marine shale that serves as a micronutrient. Excessive amounts impair aquatic life and bioaccumulation up the food chain occurs causing toxicity to birds, mammals, and humans.



Threatened & Endangered Species (Possibly in the area)
U.S. Fish & Wildlife Service - Updated November, 2005

Species Name	Scientific Name	Counties	Status
Arkansas Darter	*Etheostoma cragini*	Huerfano, Las Animas, Pueblo & Otero	Candidate
Black-tailed Prairie Dog	*Cynomys ludovicianus*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Burrowing Owl	*Athene cunicularia*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Canada Lynx	*Lynx canadensis*	Las Animas	Threatened
Couch's Spadefoot	*Scaphiopus couchii*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Flathead Chub	*Platygobio gracilus*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Greenback Cutthroat Trout	*Oncorhynchus clarki stomias*	Huerfano & Pueblo	Threatened
Mexican Spotted Owl	*Strix occidentalis lucida*	Huerfano, Las Animas & Pueblo	Threatened
Mountain Plover	*Charadrius montanus*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Plains Leopard Frog	*Rana blairi*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Suckermouth Minnow	*Phenacobius mirabilis*	Huerfano, Las Animas, Pueblo & Otero	State Endangered
Swift Fox	*Vulpes velox*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Texas Horned Lizard	*Phrynosoma cornutum*	Huerfano, Las Animas, Pueblo & Otero	State Concern
Triploid Checkered Whiptail	*Cnemidophorus neotesselatus*	Pueblo & Otero	State Concern

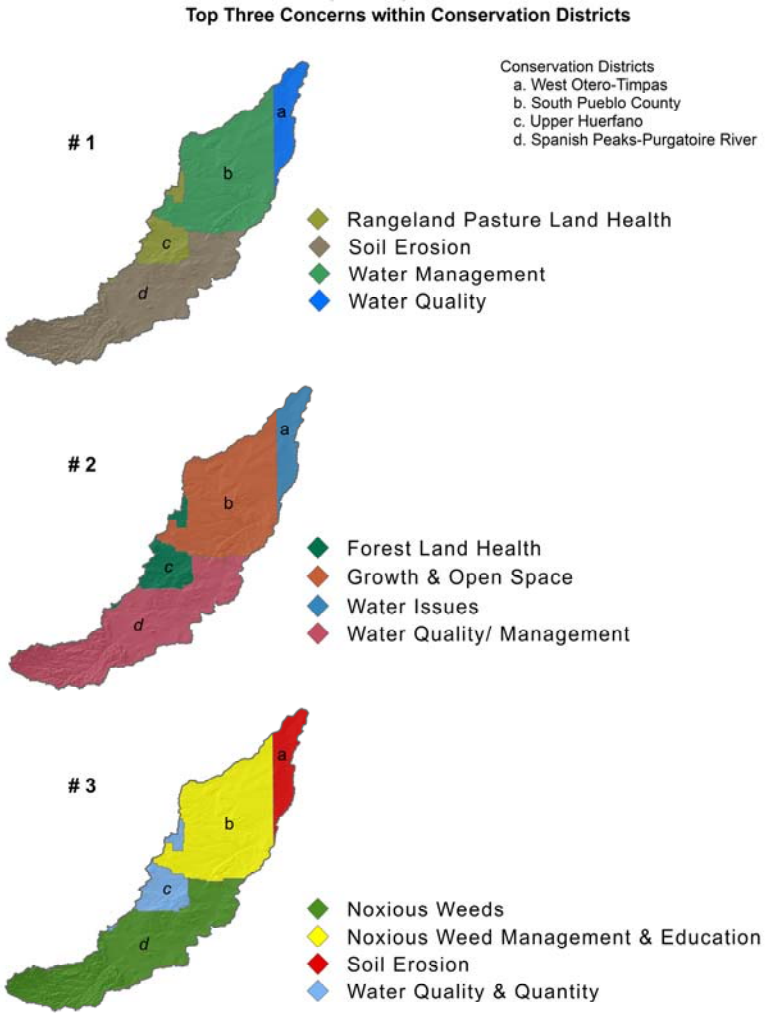
The diverse terrestrial habitat types in this watershed range from shortgrass prairie to foothills shrublands to coniferous forest. Wildlife species found in this watershed are equally diverse. Species such as mountain plover, black-tailed prairie dog, and swift fox are adapted to the scarce water found on shortgrass prairie. Seasonal streams with associated riparian areas, water supply reservoirs, and stock ponds provide aquatic habitats in the watershed. Higher in the watershed, in the shrub and forest habitats, species such as elk, Canada lynx, and Mexican spotted owl may be found. Economically important wildlife species that occur in the watershed include black bullhead, green sunfish, trout, pronghorn (antelope), mule and white-tailed deer, elk, wild turkey, mourning dove, and scaled quail. Pheasant and bobwhite quail are found near the mouth of the watershed.

Social Data	Huerfano	Las Animas	Otero	Pueblo
Demographics (US Census, American Fact-finder)				
Total population	7,862	15,207	20,311	147,187
Male	4,269	7,441	9,926	71,711
Female	3,593	7,766	10,385	75,476
Median age (years)	41.7	40.9	37.7	36
White	6,365	12,566	16,049	120,922
Black or African American	216	60	154	2046
American Indian and Alaska Native	212	387	290	1647
Asian	31	57	142	1072
Native Hawaiian and Other Pacific Islander	6	30	16	202
Some other race	740	1525	3059	16496
Hispanic or Latino (of any race)	2763	14816	7642	58024
Economic Characteristics (US Census, American Factfinder)				
In labor force (population 16 years and over)	3,148	6,558	9,102	72,727
Median household income (dollars)	25,775	28,273	29,738	37,305
Median family income (dollars)	32,664	34,072	35,906	45,765
Per capita income (dollars)	15,242	16,829	15,113	19,668
Families below poverty level	269	572	778	x
Individuals below poverty level	1247	2573	3713	x
X means that value is not applicale or not availiable				
County Agricultural Characteristics (Colorado Agricultural Census, county data tables)				
Farms (number)	292	567	488	801
Land in farms/ranches (acres)	608,002	2,304,766	546,396	774,352
Average size farm/ranch (acres)	2,082	4,065	1,120	967
Median size farm (acres)	680	1,000	170	175
Average age of farmer or rancher	58.6	57.6	52.3	55.5
Net cash return from ag sales ($1,000)	1,116	1,798	2,935	5,788
Cattle and calves (number)	13,000	47,000	65,000	33,000

Apishapa Watershed Natural Resource Concerns

The Colorado Conservation Districts identified and prioritized the following resource concerns during facilitated public meetings and are included in their Long Range Plans. Issues with the highest scores are of greater concern:

	Water Quality	Water Quantity	Erosion	Invasive Species	Rangeland	Wildlife	Development	Forestry
West Otero-Timpas	5	4	3	2	1			
South Pueblo County		5		3		2	4	
Upper Huerfano	3	3	1		5	2		4
Spanish Peaks-Purgatoire River	4	4	5	3	2	1		1
Totals	12	16	9	8	8	5	4	5



Selected Conservation Application Data

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	325,040	291,483	na	74,653	49,463	4,953	745,592
Total Conservation Systems Applied (Acres)	58,874	174,225	na	61,340	26,109	33,704	354,252
Practices							
Prescribed Grazing	9,796	145,360	12,828	59,161	5,622		232,767
Upland Wildlife Habitat Management	699	180	0	8,079	2,074		11,032
Conservation Cropping System	na	na	73	155	38		266

Conservation Systems to Address Major Resource Concerns

Primary Resource Concern:	**Rangeland Health**			
Conservation System Description:	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals..			**Based on Conservation System Guide Code:** CO 67.1-GR-01-R-Grazing
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Prescribed Grazing				
Fence (382)	Ft.	21,120	0.6	12,672
Pest Management (595)	Ac.	300	4,500	4,500
Pipeline (516)	Ft.	15,000	2.40	36,000
Upland Wildlife Habitat Management (645)	Ac.	300	na	0
Watering Facility (614)	No.	2	410	820
Windbreak/Shelterbelt Establishment (380)	Ft.	1,000	.85	850
Costs to apply prescribed grazing per median sized ranch of 4,500 acres	No.	55	54,842	
Subtotal: Rangeland costs				**$3,016,310**

Conservation Systems to Address Major Resource Concerns, continued

Primary Resource Concern:	**Water Quality**			
Conservation System Description:	Sprinkler irrigation system with IWM, Crop rotation, Mulch-till, Nutrient and Pest Mgt..			**Reference Conservation System Guide Code:** CO 69.1-CR-Pivot-R-2
Practices	**Unit**	**Quantity**	**Cost/Unit ($)**	**Estimated Cost ($)**
Irrigation System, Sprinkler (442)	Ac	4,500	779	3,505,500
Irrigation Water Management (449)	Ac	7,000	5	35,000
Pest Management (595)	Ac	7,000	15	105,000
			Subtotal Irrigated Crops:	**3,645,500**

General Effects, Impacts, and Costs of Application of Conservation Systems

Landuse	**Resource**	**Measurable Effects**	**Non-measurable Effects**	
Range	Plants, soil		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter.	**$3,016,310**
Irrigated Crop	Water, soil		Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected.	**$3,645,500**
			Estimated Total Costs to Address Major Resource Concerns:	**$6,661,810**

References Not Cited in Document

303(d) listed streams within Apishipa Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf.

Threatened and Endangered Species information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS).

Resource Concerns were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. For more information on Colorado's Conservation Districts, visit http://www.cacd.us.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado surveys:

Otero County (CO089) Published 12/20/2005

Pueblo Area (CO626) Published 12/19/2005

Huerfano County Area (CO627) Published 01/12/2007

Las Animas County Area (CO628) Published 05/01/2006

To download SSURGO data, visit http://soildatamart.nrcs.usda.gov.

Vegetation data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. visit http://ndis.nrel.colostate.edu/coveg.

Common Resource Area (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. For more information on Common Resource Areas visit http://soils.usda.gov/survey/geography/cra.html.

Average Annual Precipitation data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information on PRISM data visit http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html or for more information about technical aspects of PRISM, visit the PRISM website at http://www.ocs.orst.edu/prism.

Land Ownership (status, 2004 dataset) data was obtained from the Colorado Department of Transportation (CDOT). For more information, visit http://www.dot.state.co.us.

Relief & Elevation maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). The data was downloaded from the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov.

Conservation Systems to address major resource concerns were extracted from the Conservation Systems Guides (CSG) compiled from local conservationists by the NRCS Ecological Sciences Section at the Lakewood State Office.

Effects and Impacts of application of conservation systems were extracted from Colorado eFOTG, Section III, Resource Quality Criteria, NRCS, Colorado, March 2005.